Programming Fundamentals
Lecture #17
Structures in C Programming

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Introduction

- Structures—sometimes referred to as aggregates—are collections of related variables under one name
- Structures may contain variables of many different data types—in contrast to arrays that contain only elements of the same data type

Structure Definition

```
struct student {
   char firstName[ 20 ];
   char lastName[ 20 ];
   int age;
   char gender;
   int regNo;
};
```

Defining Variables of Structure Types

```
struct student aStudent, *studentPtr;
```

Initializing Structures

```
struct student {
  “Shahzaib”,
  “Hassan”,
  20,
  ‘m’,
  5,
};
```

Accessing Structure Members

```
printf( “%s”, aStudent.firstName );  // using dot operator on structure variable

printf( “%s”, (*studentPtr).firstName ); // using dot operator on structure pointer

printf( “%s”, aStudent->firstName );  // using arrow operator on structure variable

printf( “%s”, (*studentPtr)->firstName );  // using arrow operator on structure pointer
```

Using Structures with Functions

- Structures may be passed to functions by passing individual structure members, by passing an entire structure or by passing a pointer to a structure
- When structures or individual structure members are passed to a function, they are passed by value
- Therefore, the members of a caller’s structure cannot be modified by the called function
- To pass a structure by reference, pass the address of the structure variable